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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/627,293	07/25/2003	Hardayal Singh Gill	HSJ920030029US1	2375

7590 06/06/2005

Hitachi Global Storage Technologies  
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San Jose, CA 95193

EXAMINER
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SEFER, AHMED N

ART UNIT	PAPER NUMBER
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2826

DATE MAILED: 06/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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<b>Office Action Summary</b>	<b>Application No.</b> 10/627,293	<b>Applicant(s)</b> GILL, HARDAYAL SINGH	
	<b>Examiner</b> A. Sefer	<b>Art Unit</b> 2826	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 17 March 2005.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) 3, 11-14, 21-24 and 31-34 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 7-10, 17-20, 27-30 and 35-43 is/are allowed.
- 6) ☒ Claim(s) 1, 2, 4-6, 15, 16, 25 and 26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Response to Amendment*

1. The amendment filed March 17, 2005 has been entered and new claims 35-43 have been added.

### *Specification*

2. The following is a quotation from the relevant sections of the Patent Rules under 37 C.F.R. 1.75 that form the basis of the objection made in this office action.

(d)(1) The claim or claims must conform to the invention as set forth in the remainder of the specification and the terms and phrases used in the claims must find clear support or antecedent basis in the description so that the meaning of the terms in the claims may be ascertainable by reference to the description (see § 1.58(a)).

Claims 5, 8 and 18 recite the cobalt iron being Co(90-50)Fe(10-50), while the specification recites the cobalt iron being Co(90-50)Fe(30-50) (see page 12, line 24).

### *Claim Rejections - 35 USC § 102*

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1 and 2 are rejected under 35 U.S.C. 102(e) as being anticipated by Sato et al. (“Sato”) US PG-Pub 2003/0214004.

Sato discloses in figs. 1, 3, 9 and 15 a spin valve transistor comprising: an emitter E/15/17; a collector C; a base B between the emitter and the collector; a spin valve including a

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ferromagnetic free layer structure MF/11; a self-pinned antiparallel (AP) pinned layer structure MP/7; and a nonmagnetic spacer layer NM/9 between the free layer structure and the AP pinned layer structure; and the base comprising at least said free layer structure or comprising the free layer structure, the self-pinned AP pinned layer structure and the spacer layer (as in claim 2).

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 4-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sato in view of Gill ("Gill") USPN 6,400,536/Pinarbasi US PG-Pub 2002/0181169.

Sato discloses the device structure as recited in the claim but lacks anticipation of first and second ferromagnetic AP layers and an APC layer interposed in between.

Gill discloses in fig. 12 a self pinned AP pinned layer structure comprising a ferromagnetic first antiparallel (AP) pinned layer 210; a ferromagnetic second antiparallel (AP) pinned layer 212; a nonmagnetic antiparallel coupling (APC) layer 208 located between the first and second AP pinned layers; one of the first and second AP pinned layers having a cobalt iron (CoFe) film with a positive magnetostriction; and the CoFe film having a magnetostrictive anisotropy field that is oriented perpendicular to a head surface of the spin valve for self pinning the AP pinned layer structure.

Similarly, Pinarbasi discloses in figs. 10-12 a self pinned AP pinned layer structure comprising a ferromagnetic first antiparallel (AP) pinned layer 210; a ferromagnetic second

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antiprallel (AP) pinned layer 212; a nonmagnetic antiparallel coupling (APC) layer 208 located between the first and second AP pinned layers; one of the first and second AP pinned layers having a cobalt iron (CoFe) film with a positive magnetostriction; and the CoFe film having a magnetostrictive anisotropy field that is oriented perpendicular to a head surface of the spin valve for self pinning the AP pinned layer structure.

Since Sato and Gill are both from the same field of endeavor, GMR devices, the teachings disclosed by Gill would have been recognized in the pertinent art of Sato. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Sato's device by incorporating Gill's teachings so as to increase the sensitivity and the flux decay length of the device as taught by Gill. It would have been obvious to incorporate Pinarbasi's teachings, since that would obtain an acceptable magnetorestriction of the free layer structure as taught by Pinarbasi.

Regarding claim 5, Pinarbasi discloses (page 4, pars. 0041 and 0045) a cobalt iron being within the range recited in the claim.

Regarding claim 6, Gill discloses the first and second AP pinned layers have the same magnetic thickness.

7. Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill in view of Sato.

Gill discloses in fig. 6 a magnetic head assembly comprising: a write head 70; a read head 72 adjacent the write head; the read head including: ferromagnetic first and second shield layers 80/82, but does not disclose a spin valve transistor located between the first and second shield layers.

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Sato discloses in figs. 1, 3, 9 and 15 a spin valve transistor comprising: an emitter E/15/17; a collector C; a base B between the emitter and the collector; a spin valve including a ferromagnetic free layer structure MF/11; a self-pinned antiparallel (AP) pinned layer structure MP/7; and a nonmagnetic spacer layer NM/9 between the free layer structure and the AP pinned layer structure; and the base comprising at least said free layer structure.

Since Gill and Sato are both from the same field of endeavor, GMR devices, the teachings disclosed by Sato would have been recognized in the pertinent art of Gill. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Gill's device by incorporating Sato's teachings so as to improve the current transmittance of the device as taught by Sato.

Regarding claim 16, Gill discloses in fig. 12 a self pinned AP pinned layer structure comprising a ferromagnetic first antiparallel (AP) pinned layer 210; a ferromagnetic second antiparallel (AP) pinned layer 212; a nonmagnetic antiparallel coupling (APC) layer 208 located between the first and second AP pinned layers; one of the first and second AP pinned layers having a cobalt iron (CoFe) film with a positive magnetostriction; and the CoFe film having a magnetostrictive anisotropy field that is oriented perpendicular to a head surface of the spin valve for self pinning the AP pinned layer structure.

8. Claims 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gill in view of Sato.

Gill discloses in figs. 3-6 a magnetic disk drive comprising: at least one magnetic head assembly 40 that has a head surface; the magnetic head assembly having a write head 70 and a read head 72; the read head including: ferromagnetic first and second shield layers 80 and 82; a

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housing 55; a magnetic medium supported in the housing; a support mounted in the housing for supporting the magnetic head assembly with said head surface facing the magnetic medium so that the magnetic head assembly is in a transducing relationship with the magnetic medium; a motor 38 for moving the magnetic medium; and a processor 50 connected to the magnetic head assembly and to the motor for exchanging signals with the magnetic head assembly and for controlling movement of the magnetic medium, but does not disclose a spin valve transistor located between the first and second shield layers.

Sato discloses in figs. 1, 3, 9 and 15 a spin valve transistor comprising: an emitter E/15/17; a collector C; a base B between the emitter and the collector; a spin valve including a ferromagnetic free layer structure MF/11; a self-pinned antiparallel (AP) pinned layer structure MP/7; and a nonmagnetic spacer layer NM/9 between the free layer structure and the AP pinned layer structure; and the base comprising at least said free layer structure.

Since Gill and Sato are both from the same field of endeavor, GMR devices, the teachings disclosed by Sato would have been recognized in the pertinent art of Gill. Therefore, it would have been obvious to one skilled in the art at the time the invention was made to modify Gill's device by incorporating Sato's teachings so as to improve the current transmittance of the device as taught by Sato.

Regarding claim 26, Gill discloses in fig. 12 a self pinned AP pinned layer structure comprising a ferromagnetic first antiparallel (AP) pinned layer 210; a ferromagnetic second antiparallel (AP) pinned layer 212; a nonmagnetic antiparallel coupling (APC) layer 208 located between the first and second AP pinned layers; one of the first and second AP pinned layers having a cobalt iron (CoFe) film with a positive magnetostriction; and the CoFe film having a

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magnetostrictive anisotropy field that is oriented perpendicular to a head surface of the spin valve for self pinning the AP pinned layer structure.

*Allowable Subject Matter*

9. Claims 7-10, 17-20, 27-30 and 35-43 are allowed.

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SUPERVISORY PATENT EXAMINER  
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Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Sefer whose telephone number is (571) 272-1921.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nathan Flynn can be reached on (571) 272-1915.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ANS  
May 26, 2005